WHAT IS CLAIMED IS:

1. A receiver comprising:

an equalizer;

a decoder arranged to decode data from a signal, wherein the signal is based upon an output of the equalizer;

an encoder arranged to re-encode the decoded data;

an error generator arranged to generate an error based upon the signal and the re-encoded data and to weight the error according to a reliability that the decoder accurately decoded the data from the signal; and,

a controller arranged to control the equalizer in response to the weighted error.

2. The receiver of claim 1 wherein the re-encoded data correspond to a plurality of first data elements, wherein a first portion of the first data elements designates a sign, wherein a second portion of the first data elements designates a plurality of second data elements, wherein a third portion of the first data elements designates a plurality of third data elements, wherein the encoder supplies an output, and wherein the output of the

encoder includes a plurality of fourth data elements derived from the sign and the second and third data elements.

3. The receiver of claim 2 wherein the fourth data elements are derived by multiplying the second and third data elements and by applying the sign to a result of the multiplication.

4. The receiver of claim 2 wherein the second data elements correspond to a coset leader, and wherein the third data elements correspond to a Walsh function.

5. The receiver of claim 4 wherein the fourth data elements are derived by multiplying the second and third data elements and by applying the sign to a result of the multiplication.

6. The receiver of claim 1 wherein the decoder performs a Walsh transform.

7. The receiver of claim 1 wherein the signal includes a code vector, wherein the code vector is one of a plurality of code vectors divided into cosets, and wherein the decoder correlates the code vector with a coset leader uniquely corresponding to each coset.

8. The receiver of claim 7 wherein the re-encoded data correspond to a plurality of first data elements, wherein a first portion of the first data elements designates a sign, wherein a second portion of the first data elements designates a plurality of second data elements corresponding to one of the coset leaders, wherein a third portion of the first data elements designates a plurality of third data elements, wherein the encoder supplies an output, and wherein the output of the encoder includes a plurality of fourth data elements derived from the sign and the second and third data elements.

9. The receiver of claim 8 wherein the fourth data elements are derived by vector multiplying the second and third data elements and by applying the sign to a result of the multiplication.

10. The receiver of claim 9 wherein the decoder performs Walsh transforms, and wherein the third data elements correspond to a Walsh function.

11. The receiver of claim 7 wherein the code vector is a Kerdock code vector.

12. The receiver of claim 1 wherein the decoder produces correlation peaks from the signal and references.

13. The receiver of claim 12 wherein the reliability is based upon a largest one of the correlation peaks.

14. The receiver of claim 12 wherein the reliability is based upon a comparison between a square of a correlation peak having the largest magnitude and a square of a correlation peak having the next largest magnitude.

15. The receiver of claim 12 wherein the reliability is based upon a comparison between a correlation peak having the largest magnitude and a correlation peak having the next largest magnitude.

16. The receiver of claim 15 wherein the signal includes a code vector, wherein the code vector is one of a plurality of code vectors divided into cosets, and wherein the references are coset leaders uniquely corresponding to the cosets.

17. The receiver of claim 16 wherein the decoder multiplies the signal by the coset leaders, and wherein the decoder performs corresponding Walsh transforms on results of the multiplications.

18. The receiver of claim 16 wherein the re-encoded data correspond to a plurality of first data elements, wherein a first portion of the first data elements designates a sign, wherein a second portion of the first data elements designates a plurality of second data elements corresponding to one of the coset leaders, wherein a third

portion of the first data elements designates a plurality of third data elements, wherein the encoder supplies an output, and wherein the output of the encoder includes a plurality of fourth data elements derived from the sign and the second and third data elements.

19. The receiver of claim 18 wherein the fourth data elements are derived by vector multiplying the second and third data elements and by applying the sign to a result of the multiplication.

20. The receiver of claim 19 wherein the decoder performs Walsh transforms, and wherein the third data elements correspond to a Walsh function.

21. The receiver of claim 16 wherein the code vector is a Kerdock code vector.

22. The receiver of claim 1 wherein the controller is an LMS adaptive controller.

23. The receiver of claim 1 wherein the decoder produces a soft output comprising data and a reliability factor.

24. An electrical signal representing a plurality of first data elements, wherein a first portion of the first data elements designates a sign, wherein a second portion of the first data elements designates a plurality of second data elements, wherein a third portion of the first data elements designates a plurality of third data elements, and wherein the electrical signal includes a plurality of fourth data elements derived from the sign and the second and third data elements.

25. The electrical signal of claim 24 wherein the fourth data elements are derived by multiplying the second and third data elements and by applying the sign to a result of the multiplication.

26. The electrical signal of claim 24 wherein the second data elements correspond to a coset leader, and wherein the third data elements correspond to a Walsh function.

27. The electrical signal of claim 26 wherein the fourth data elements are derived by multiplying the second and third data elements and by applying the sign to a result of the multiplication.

28. The electrical signal of claim 24 wherein the fourth data elements comprise a code vector.

29. The electrical signal of claim 28 wherein the code vector is one of a plurality of code vectors divided into cosets, and wherein each coset has a coset leader uniquely corresponding to its coset.

30. The electrical signal of claim 29 wherein the fourth data elements are derived by vector multiplying the second and third data elements and by applying the sign to a result of the multiplication.

31. The electrical signal of claim 29 wherein the second data elements correspond to one of the coset leaders, and wherein the third data elements correspond to a Walsh function.

32. The electrical signal of claim 31 wherein the fourth data elements are derived by vector multiplying the second and third data elements and by applying the sign to a result of the multiplication.

33. The electrical signal of claim 32 wherein the code vector is a Kerdock code vector.

34. A method comprising:

decoding data from a data signal, wherein the data signal is based upon an output of an equalizer;

re-encoding the decoded data;

providing a feedback signal based upon the data signal, the re-encoded data, and a reliability that the decoding of the data from the data signal is performed accurately; and,

controlling the equalizer in response to the feedback signal.

35. The method of claim 34 wherein the decoding of data from the data signal comprises re-encoding the decoded data according to first, second, and third portions of the decoded data, wherein the first portion designates a sign, wherein the second portion designates first data, and wherein the third portion designates second data.

36. The method of claim 35 wherein the decoding of data from the data signal comprises multiplying the first and second data and applying the sign to a result of the multiplication.

37. The method of claim 35 wherein the first data correspond to a coset leader, and wherein the second data correspond to a Walsh function.

38. The method of claim 37 wherein the decoding of data from the data signal comprises multiplying the first and second data and applying the sign to a result of the multiplication.

39. The method of claim 34 wherein the decoding of data from the data signal comprises applying a Walsh transform to the data signal.

40. The method of claim 34 wherein the data signal includes a received code vector.

41. The method of claim 40 wherein the received code vector is one of a plurality of code vectors divided into cosets, and wherein the decoding of data from the data signal comprises multiplying the received code vector by a coset leader uniquely corresponding to each coset.

42. The method of claim 41 wherein the re-encoding of the decoded data comprises re-encoding the decoded data according to first, second, and third portions of the decoded data, wherein the first portion designates a

sign, wherein the second portion designates first data, and wherein the third portion designates second data.

43. The method of claim 42 wherein the re-encoding of the decoded data comprises multiplying the first and second data and applying the sign to a result of the multiplication.

44. The method of claim 42 wherein the first data correspond to one of the coset leaders, and wherein the second data correspond to a Walsh function.

45. The method of claim 44 wherein the re-encoding of the decoded data comprises multiplying the first and second data and applying the sign to a result of the multiplication.

46. The method of claim 45 wherein the multiplying of the first and second data comprises vector multiplying the first and second data.

47. The method of claim 41 wherein the decoding of data from the data signal comprises performing Walsh transforms, and wherein the second data correspond to a Walsh function.

48. The method of claim 40 wherein the code vector is a Kerdock code vector.

49. The method of claim 34 wherein the decoding of data from the data signal comprises correlating the data signal with references to generate correlation peaks.

50. The method of claim 49 wherein the decoding of data from the data signal comprises determining the data based upon a largest correlation peak.

51. The method of claim 49 wherein the providing of a feedback signal comprises weighting the feedback signal according to a largest correlation peak.

52. The method of claim 49 wherein the providing of a feedback signal comprises weighting the feedback signal according to a comparison of a largest correlation peak to a next largest correlation peak.

53. The method of claim 49 wherein the providing of a feedback signal comprises weighting the feedback signal according to a comparison of a square of a largest correlation peak to a square of a next largest correlation peak.

54. The method of claim 49 wherein the data signal includes a code vector, wherein the code vector is one of a plurality of code vectors divided into cosets, and wherein the correlating of the data signal with references comprises multiplying the received code vector by a coset leader uniquely corresponding to each coset.

55. The method of claim 54 wherein the correlating of the data signal with references comprises performing Walsh transforms on results of multiplying the received code vector by a coset leader uniquely corre-

sponding to each coset, and wherein the second data correspond to a Walsh function.

56. The method of claim 54 wherein the re-encoding of the decoded data comprises re-encoding the decoded data according to first, second, and third portions of the decoded data, wherein the first portion designates a sign, wherein the second portion designates first data, and wherein the third portion designates second data.

57. The method of claim 56 wherein the re-encoding of the decoded data comprises multiplying the first and second data and applying the sign to a result of the multiplication.

58. The method of claim 56 wherein the first data correspond to a coset leader, and wherein the second data correspond to a Walsh function.

59. The method of claim 58 wherein the re-encoding of the decoded data comprises multiplying the first and second data and applying the sign to a result of the multiplication.